

Service Manual

24
6610
ORDER NO. AD9003062C2

QUARTZ Synthesizer
LW/MW/FM Stereo Tuner

Tuner
ST-610L



Color

(K) Black Type
(S) Silver Type

Area

Country Code	Area	Color
(E)	Continental Europe	(K) (S)
(EB)	Great Britain	(K) (S)
(EF)	France	(K)

SPECIFICATIONS

(DIN 45 500)

FM TUNER SECTION

Frequency range	87.50~108.00 MHz (50 kHz-steps)
Sensitivity	1.5 μ V (IHF, usable)
S/N 30 dB	1.3 μ V (75 Ω)
S/N 26 dB	1.2 μ V (75 Ω)
S/N 20 dB	0.9 μ V (75 Ω)
IHF 46 dB stereo quieting sensitivity	28 μ V/75 Ω
Total harmonic distortion	MONO 0.15%
	STEREO 0.3%
S/N	MONO 70 dB (78 dB, IHF)
	STEREO 65 dB (70 dB, IHF)
Frequency response	20 Hz~15 kHz, +0.5 dB~-1.5 dB
Alternate channel selectivity normal $\pm$ 400 kHz	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	45 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	75 dB
AM suppression	55 dB
Stereo separation 1 kHz	40 dB
10 kHz	30 dB
Carrier leak 19 kHz	-30 dB (-35 dB, IHF)
38 kHz	-45 dB (-50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	$\pm$ 1.5 dB
Limiting point	-1.2 μ V
Bandwidth IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

AM TUNER SECTION

Frequency range	
MW	522 kHz~1611 kHz (9 kHz-steps)
	530 kHz~1620 kHz (10 kHz-steps)
LW	155 kHz~353 kHz (9 kHz-steps)
	153 kHz~351 kHz (-2 kHz shift)
Sensitivity (S/N 20 dB) MW	20 μ V, 300 μ V/m
	LW 50 μ V
Selectivity ($\pm$ 9 kHz) MW (at 999 kHz)	50 dB
	LW (at 254 kHz) 50 dB
Image rejection MW (at 999 kHz)	40 dB
	LW (at 254 kHz) 40 dB
IF rejection MW (at 999 kHz)	60 dB
	LW (at 254 kHz) 60 dB

GENERAL

Output voltage	0.3 V (0.6 V IHF)
Power consumption	9 W
Power supply	
For Great Britain:	AC 50 Hz/60 Hz, 240 V
For others:	AC 50 Hz/60 Hz, 220 V
Dimensions (W×H×D):	430×69×290 mm
	(16 $\frac{5}{16}$ "×2 $\frac{3}{32}$ "×11 $\frac{1}{16}$ ")
Weight:	2.4 kg (5.3 lb.)

Notes:

- Specifications are subject to change without notice.
- Weight and dimensions are approximate.
- Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

6610

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ACCESSORIES

- AC power supply cord 1
For [EB] area only (SJA193)
For others areas (SFDAC05E03)
- Stereo pin cord 1
(SJP2276)
- FM indoor antenna 1
(SSA270M)

- Attachment plug 1
For [EB], [EF] areas (SJP9009)
- AM loop antenna Ass'y 1
(SPB1163T)
- AM antenna holder 1
(SMA233-1M)
- Screws 2
(XTN3+10AFZ)

CONNECTIONS

The indication AM used here includes both MW and LW.

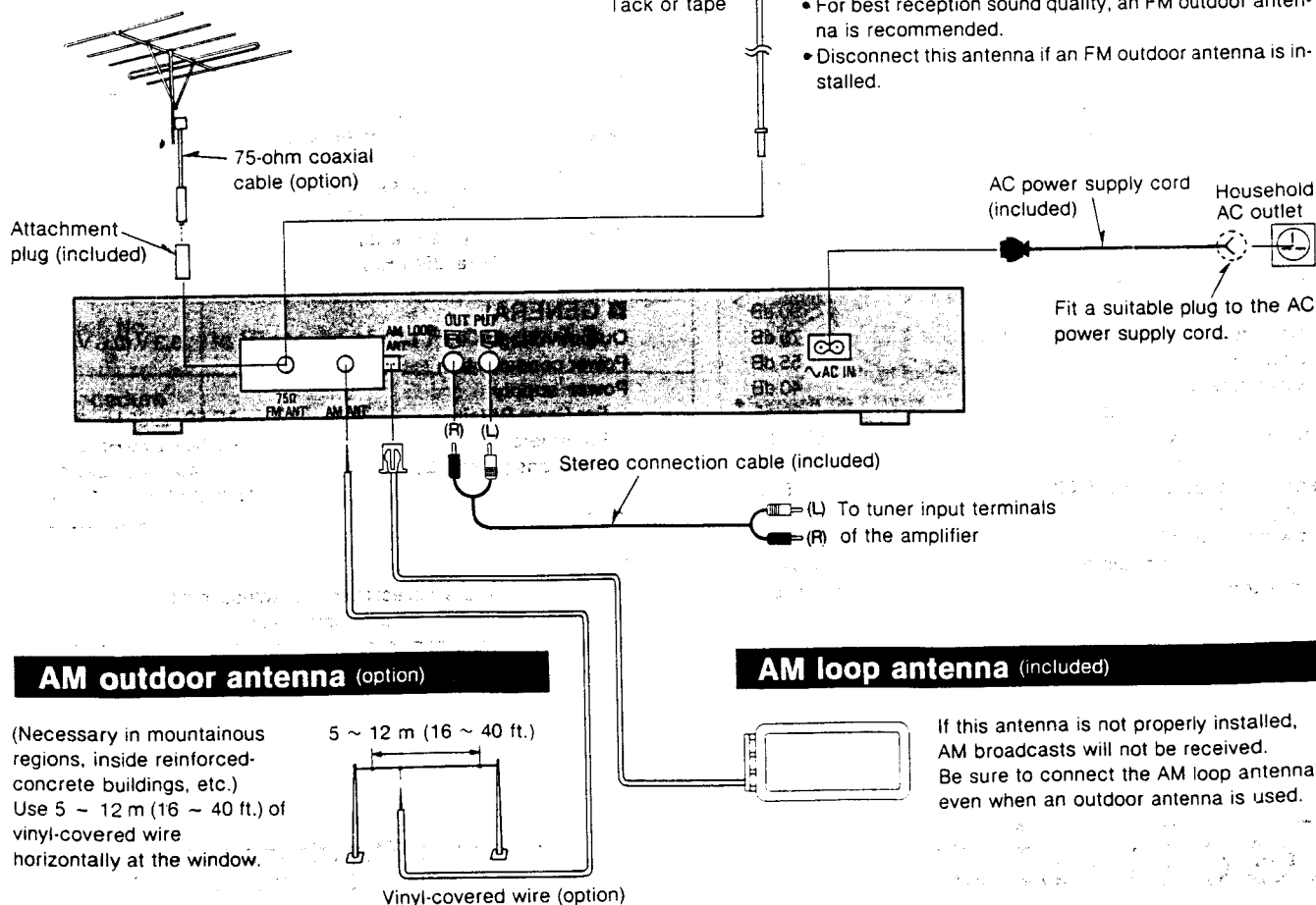
Note: An outdoor antenna should be installed by a competent technician only.

FM outdoor antenna (option)

(Necessary in mountainous regions, inside reinforced-concrete buildings, etc.)

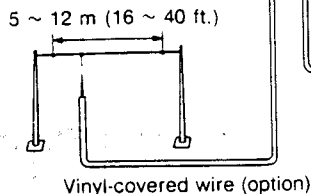
FM indoor antenna (included)

- Attach to a wall (using tack or tape) facing in direction of best reception.
- Tack should not contact internal antenna wire.
- For best reception sound quality, an FM outdoor antenna is recommended.
- Disconnect this antenna if an FM outdoor antenna is installed.



AM outdoor antenna (option)

(Necessary in mountainous regions, inside reinforced-concrete buildings, etc.)
Use 5 ~ 12 m (16 ~ 40 ft.) of vinyl-covered wire horizontally at the window.



AM loop antenna (included)

If this antenna is not properly installed, AM broadcasts will not be received. Be sure to connect the AM loop antenna even when an outdoor antenna is used.

LOCATIONS OF CONTROLS

The indication AM used here includes both MW and LW.

Power "standby /on" switch (power/ standby on)

This switch switches ON and OFF the secondary circuit power only.

The unit is in the "standby" condition when this switch is set to the standby  position. Regardless of the switch setting, the primary circuit is always "live" as long as the power cord is connected to an electrical outlet.

FM stereo indicator (stereo)

This indicator automatically illuminates when an FM stereo broadcast is being received.

Note:

It will not illuminate if the FM mode selector is set to the monaural mode.

Digital frequency display

The reception frequency of the FM or AM broadcast selected by using the tuning buttons or the preset-tuning buttons is indicated by a digital-type display.

Quartz-lock indicator (quartz lock)

This indicator illuminates when tuned precisely to an FM or AM station.

Band selectors (band)

FM:

Press this button to listen to an FM broadcast.

MW:

Press this button to listen to an MW broadcast.

allocation:

This button is also used to select a frequency step of either 9 kHz or 10 kHz.

When the MW button is pressed for about 4 seconds, the MW frequency step will change to 10 kHz per step.

(This step is set to 9 kHz before shipment.)

Set to the appropriate position for your locality.

In order to return to the original frequency indication, press this button for about 4 seconds again.

LW:

Press this button to listen to an LW broadcast.

freq shift:

When the LW button is pressed for about 4 seconds during reception of an LW broadcast, the LW frequency will decrease by 2 kHz.

So, for example, to receive 153 kHz, tune to 155 kHz, and then press this button.

In order to return to the original frequency indication, press this button for about 4 seconds again.

Memory indicator (M)

This indicator illuminates when the memory button is pressed.

Channel display

The channel number selected by the preset-tuning buttons is displayed.

Tuning buttons (tuning)

These buttons are used for tuning to the desired broadcast station.

Memory button (memory)

This button is used when preset memory setting of the preset-tuning buttons is made.

Signal-strength indicators (signal)

These indicators show the relative strength of broadcast signals being received by the antenna. The best condition for reception, for FM and AM, is when the indicators illuminate completely to the right.

FM mode selector (FM mode)

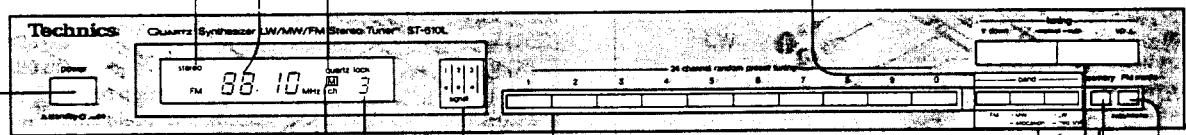
This unit automatically switches into the stereo mode when a stereo broadcast is received. Press this button to listen in the monaural mode. The stereo indicator will not illuminate in the monaural mode.

Preset-tuning buttons (1~0) (24 channel random preset tuning)

These buttons are used to preset FM and AM broadcast frequencies into the memory of this unit, and are also pressed to select the desired preset frequencies.

Note:

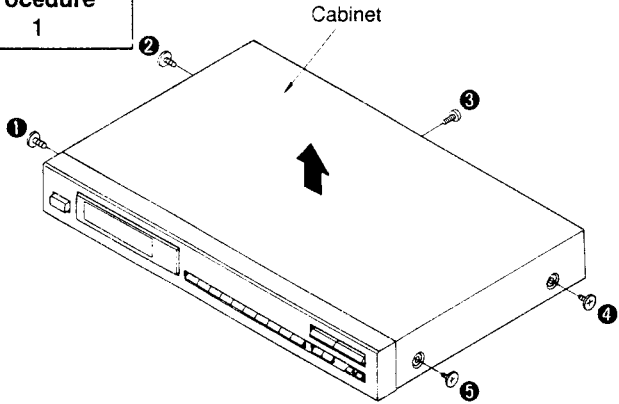
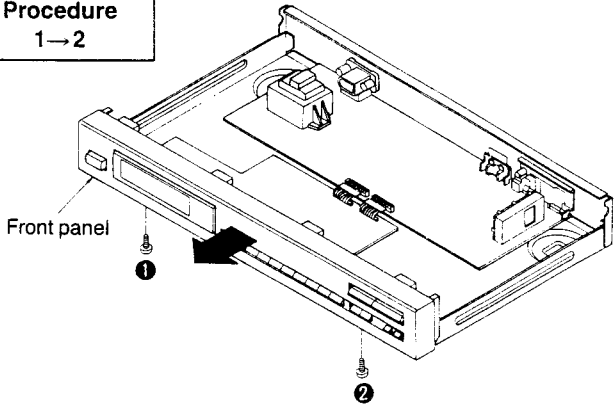
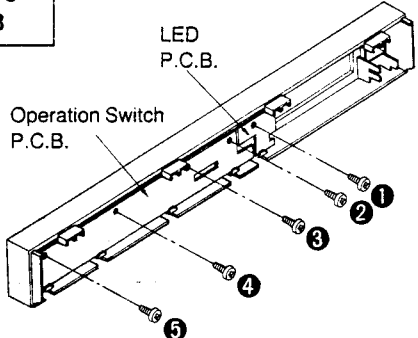
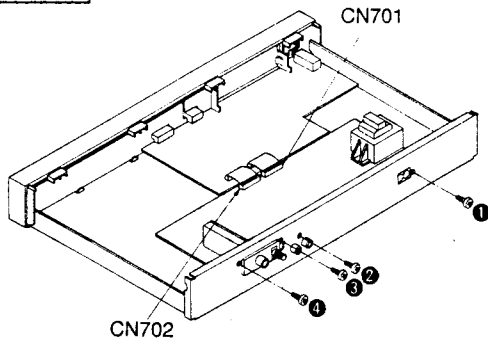
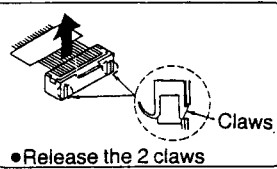
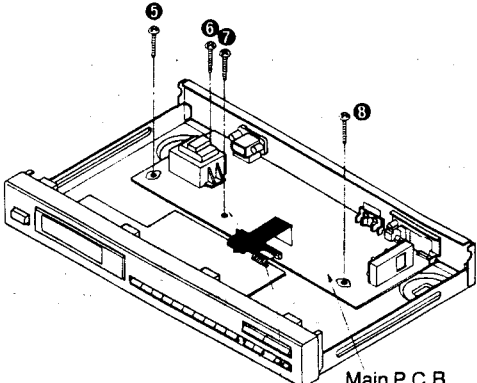
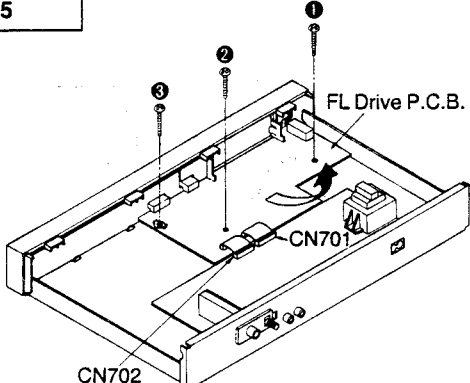
Refer to page 6 for information concerning preset memory.



DISASSEMBLY INSTRUCTIONS

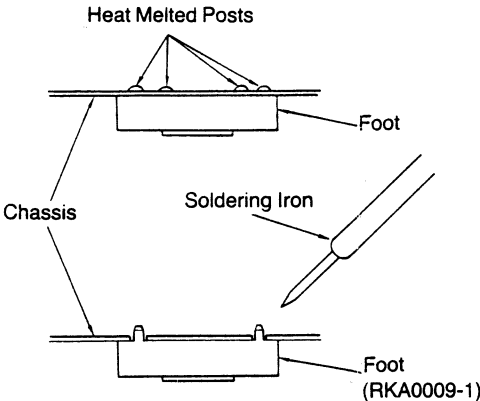
"ATTENTION SERVICER"

Some chassis components may have sharp edges. Be careful when disassembling and servicing.

Ref. No. 1	Removal of the Cabinet	Ref. No. 2	Removal of the Front Panel
Procedure 1	 ● Remove the 5 screws (①~⑤).	Procedure 1→2	 1. Remove the 2 screws (①, ②). 2. Remove the front panel in the direction of the arrow.
Ref. No. 3	Removal of the Operation Switch P.C.B. and LED P.C.B.	Ref. No. 4	Removal of the Main P.C.B.
Procedure 1→2→3	 ■ LED P.C.B. ● Remove the 1 screw (①). ■ Operation Switch P.C.B. ● Remove the 4 screws (②~⑤).	Procedure 1→4	1. Remove the 2 connector (CN701, CN702). 2. Remove the 4 screws (①~④).  Removal of the connector  ● Release the 2 claws
Ref. No. 5	Removal of the FL Drive P.C.B.	 3. Remove the 4 screws (⑤~⑧). 4. Remove the main P.C.B. in the direction of the arrow.	
Procedure 1→5	 1. Remove the 2 connector (CN701, CN702). 2. Remove the 3 screws (①~③). 3. Remove the FL drive P.C.B. in the direction of the arrow.		

●Replacement of the Foot.

1. Remove the 4 heat melted posts on the chassis with a pair of nippers or similar tool.
2. To replace the foot (RKA0009-1) on the chassis, melt the 4 posts with a soldering iron.



■ MEASUREMENTS AND ADJUSTMENTS

■ FM ADJUSTMENT

Control positions and equipment used

- FM signal generator (FM-SG)
- Stereo modulator
- Distortion analyser
- Oscilloscope
- Choke coil (100μH)
- Resistor(100kΩ)
- Frequency counter
- DC electronic voltmeter(EVM)

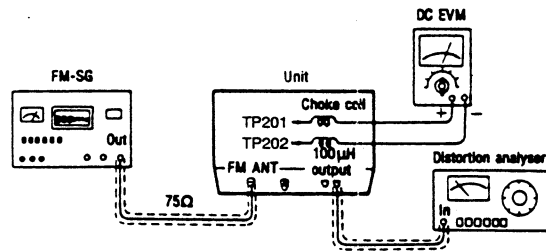
Note: For Z201 and Z202, they are supplied as adjusted parts. So, do not turn the cores of the parts.

FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "FM" mode.
3. Set the radio frequency display and signal generator to 100.10MHz.
4. Adjust the core of T201 so that the voltage measured in signal mode is 0mV (0±20 mV) in 300 mV range.
5. Adjust T202 so that the distortion factor of L-CH is minimized.
6. Repeat steps 4 and 5.
7. Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 1kHz
Output level 66dB



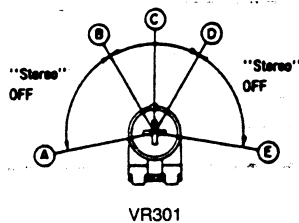
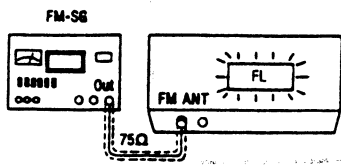
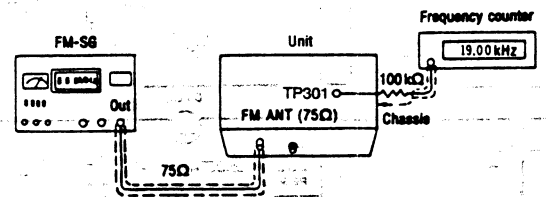
MPX VCO ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "auto" position.
3. Set the radio frequency display and signal generator to 100.10MHz.
4. Adjust VR301 for 19kHz±30Hz on frequency counter reading.

●USING ALTERNATE SYSTEM

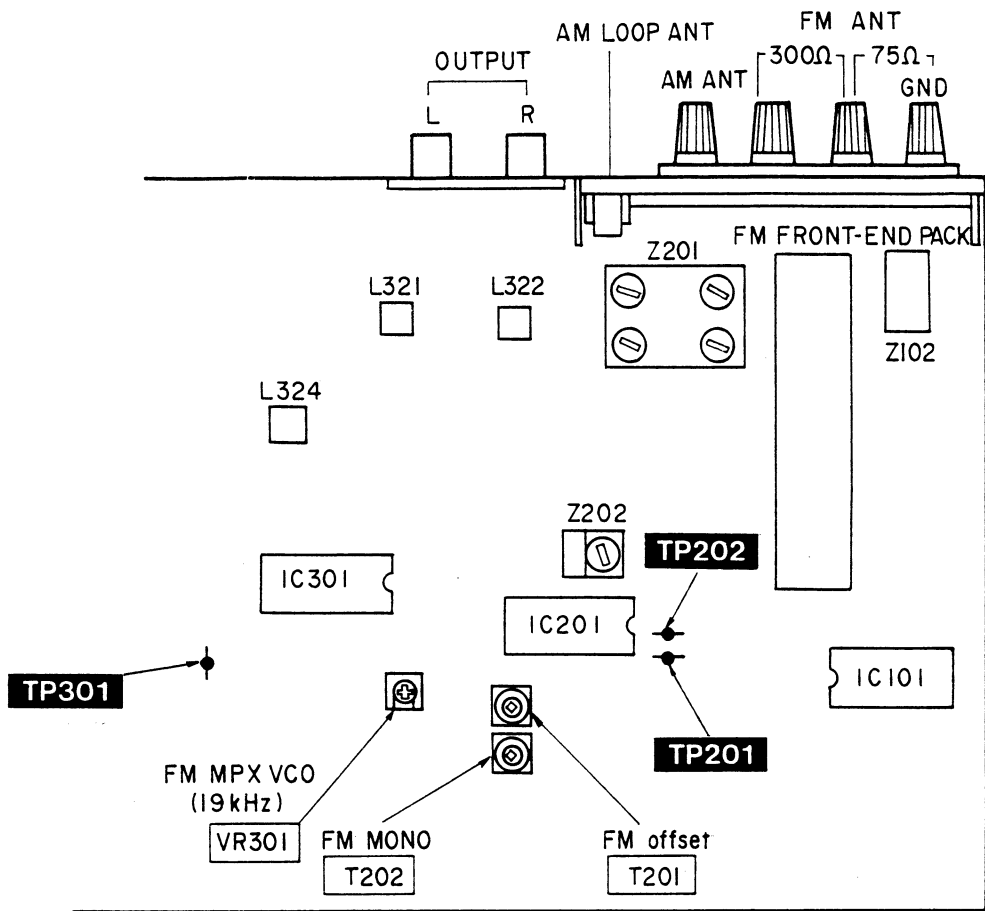
1. Apply stereo signal from generator or receive the stereo broadcast.
2. Adjust VR301 until stereo indicator lights up. Fix the arm of VR301 as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation 0%
Modulation frequency 0 kHz
Output level 66dB



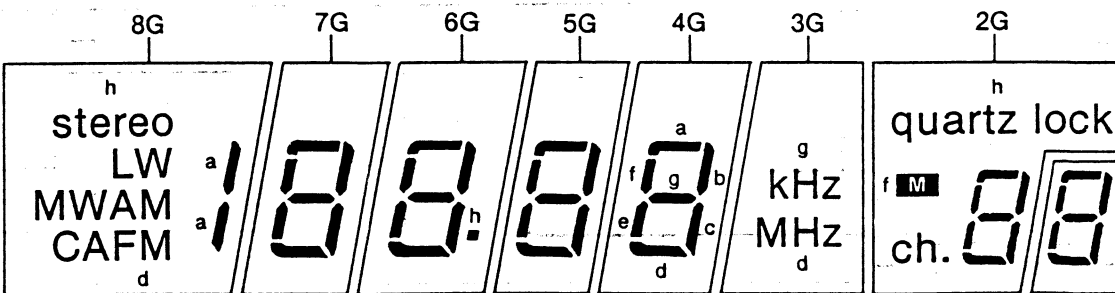
- A-B..... "Stereo" OFF position
- B-C..... "Stereo" ON position (Indicator lighting)
- C..... Adjust point of pilot circuit

●ADJUSTMENT POINTS



■ DESCRIPTION OF FL PANEL [FL901 (SAD8MT10ZYK)]

● GRID ASSIGNMENT

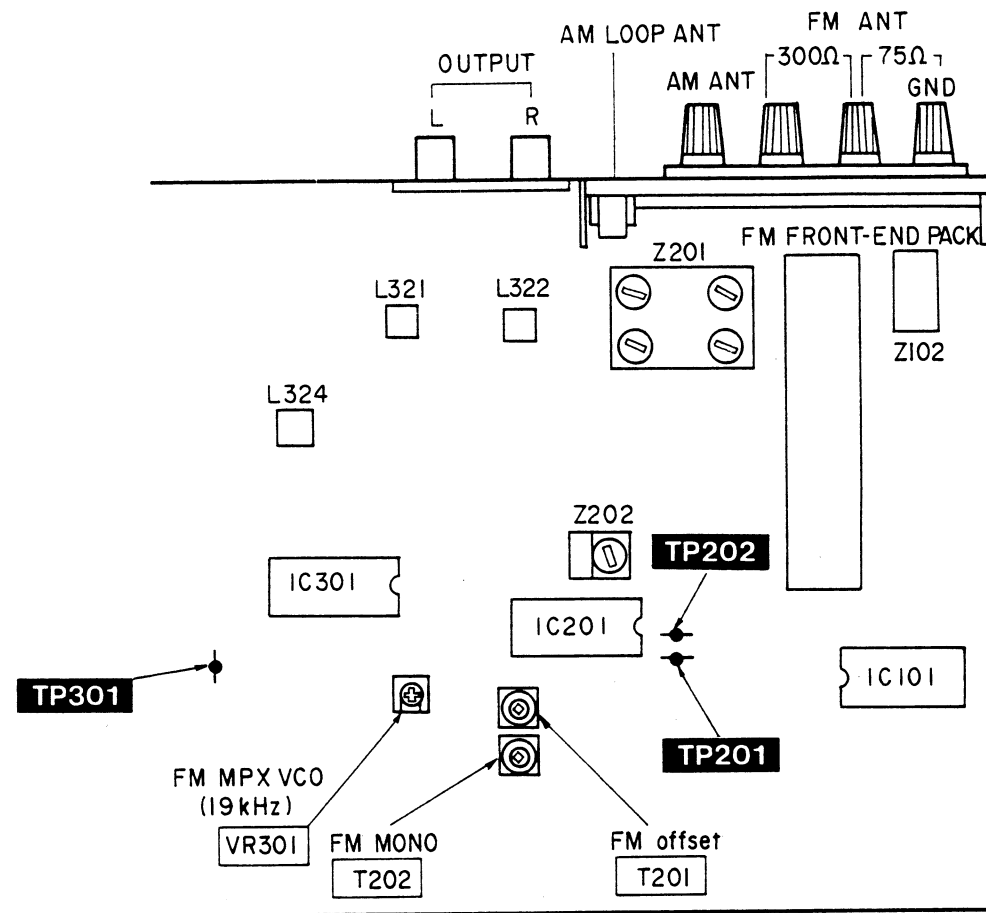


Note: The grid of 3G and 8G are used for external connection.

● PIN CONNECTION

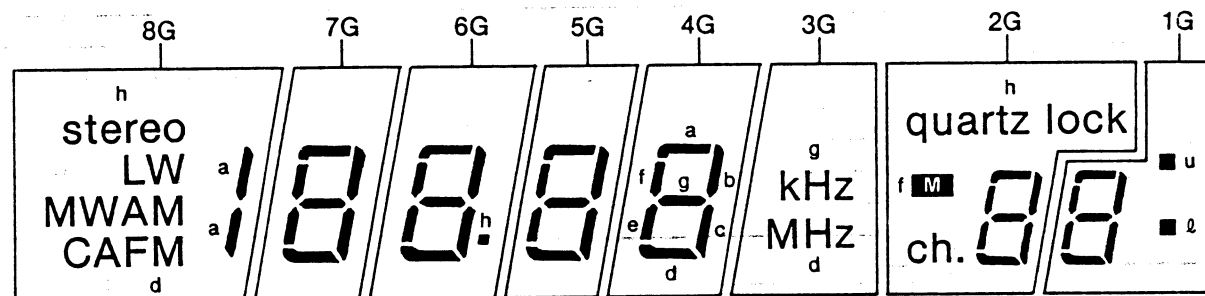
PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONNECTION	F1	F1	NP	h	f	8G	AM	MW	CA	LW	7G	c	a	6G	e	d	g	5G
PIN NO.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
CONNECTION	b	NP	4G	NP	NP	3G	NP	NP	ch	2G	NP	u	1G	l	NP	F2	F2	

● ADJUSTMENT POINTS



■ DESCRIPTION OF FL PANEL [FL901 (SAD8MT10ZYK)]

• GRID ASSIGNMENT



Note: The grid of 3G and 8G are used for external connection.

• PIN CONNECTION

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONNECTION	F1	F1	NP	h	f	8G	AM	MW	CA	LW	7G	c	a	6G	e	d	g	5G
PIN NO.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
CONNECTION	b	NP	4G	NP	NP	3G	NP	NP	ch	2G	NP	u	1G	l	NP	F2	F2	

■ FUNCTIONS OF IC TERMINALS (IC901: LC6512A3997)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1	INPUT	PB3	Computer drive terminal.
2	OUTPUT	DATA	Data output $t > \frac{8}{f_{XOSC}}$
3		CL	CL
4		CE	CE
5	—	PC3	Not used in this unit.
6	—	NC	Not used in this unit.
7	OUTPUT	PD0	Auto/mono changeover terminal. (auto → 0V, mono → 5V)
8	OUTPUT	PD1	Computer drive terminal.
9	—	PD2	Not used in this unit.
10		PD3	
11		PE0	
12	OUTPUT	PE1	Digital signal terminal for display. Terminal for key return signal to external key matrix.
14		PE3	
22		PF0	
25		PF3	
15	INPUT	RES	Reset terminal.
16	—	TEST	Ground terminal.
17		V _{SS}	
18	—	NC	Not used in this unit.
19			
20	INPUT	OSC1	Connecting terminal for crystal oscillator.
21	OUTPUT	OSC2	
26	OUTPUT	PG0	Segment signal terminal for display.
29		PG3	
31		PH0	
34		PH3	
30	—	NC	Not used in this unit.
35	—	NC	Not used in this unit.
36	OUTPUT	P11	Muting signal terminal. (Muting → High level)
37	INPUT	HOLD	Terminal for power failure detection.
38	INPUT	INT	Terminal for remote control cord.
39	INPUT	V _{DD}	Power supply terminal of device. Voltage of 5V is supplied during operation of device.
40	INPUT	PA0 PA3	Terminal for key return signal to external key matrix.
41			
44			
45			
42	—	NC	Not used in this unit.
43			
46	INPUT	PB0 PB2	Stereo signal terminal.
47			SD signal terminal.
48			Tuner select terminal. (Ground connection)

[KEY MATRIX]

Pin No.	45	44	41	40
14	CH4	CH3	CH2	CH1
22	CH8	CH7	CH6	CH5
23	—	—	CH0	CH9
24	—	—	AM	FM
25	MODE	MEMORY	UP	DOWN





■ SCHEMATIC DIAGRAM (Parts list on pages 16~18)

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

- S701: Power source switch in "on" position.
- S901~910: Preset tuning switches.
S901: CH1, S902: CH2, S903: CH3, S904: CH4,
S905: CH5, S906: CH6, S907: CH7, S908: CH8,
S909: CH9, S910: CH0
- S911~S913: Band selector switches.
(S911: FM, S912: MW, S913: LW)
- S914: Memory set switch.
- S915: FM mode selector switch.
- S916, S917: Tuning switches.
(S916: down, S917: UP)

•Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

() : AM voltage, [] : MUTING voltage

- Positive voltage lines ——— Negative voltage line
- FM OSC ——— FM signal
- AM OSC ——— AM signal
- AF signal lines ———

Important safety notice

Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

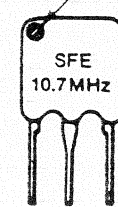
•Use of ceramic filters in pairs

The ceramic filters (CF201, CF202) for FM-IF circuit are available in three ranks. For this circuit, be sure to use the ceramics of the same rank in a pair.

At repairing and replacement, pay close attention to the resistors (R907, R908) for use as different resistors must be used depending on each rank of the ceramic filters.

Color making

(Red, Blue or Orange)



RANK (Color)	R908	R907	CENTER FREQUENCY
Orange	○	×	10.72 MHz
Red	×	×	10.70 MHz
Blue	×	○	10.67 MHz

Note: ○ mark: Resistor is used.
× mark: Resistor is not used.

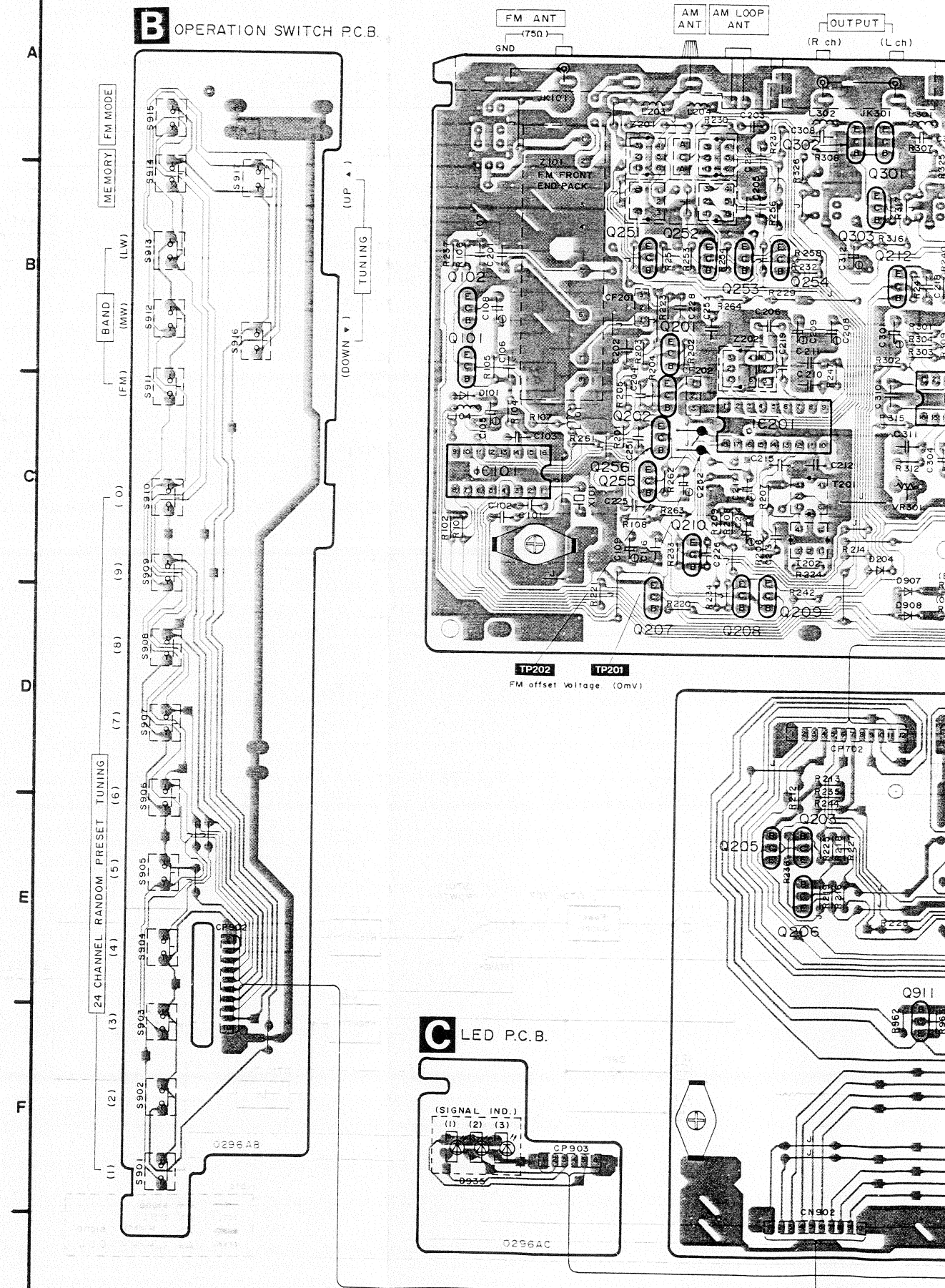
•Caution!

- IC and LSI are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair.
- Cover the parts boxes made of plastics with aluminum coil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

LM7001 	AN7470 	AN7273W 	LC6512A3997 	2SA933SQSTA 2SC1740SQSTA DTA114YSTP DTC114YSTP DTA144ESTP DTC124ESTP DTC144ESTP 	
2SC2787LTA 2SD1450RSTTA 	2SC3940AQSTA 	1SS254TA 1SS291TA 1SR35200TB 	MA4150MTA 	MA4051MTA MA4062MTA 	LN031441P

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Parts list on pages 16~18)



■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Parts list on pages 16~18)

uit are available in
amics of the same

to the resistors
used depending

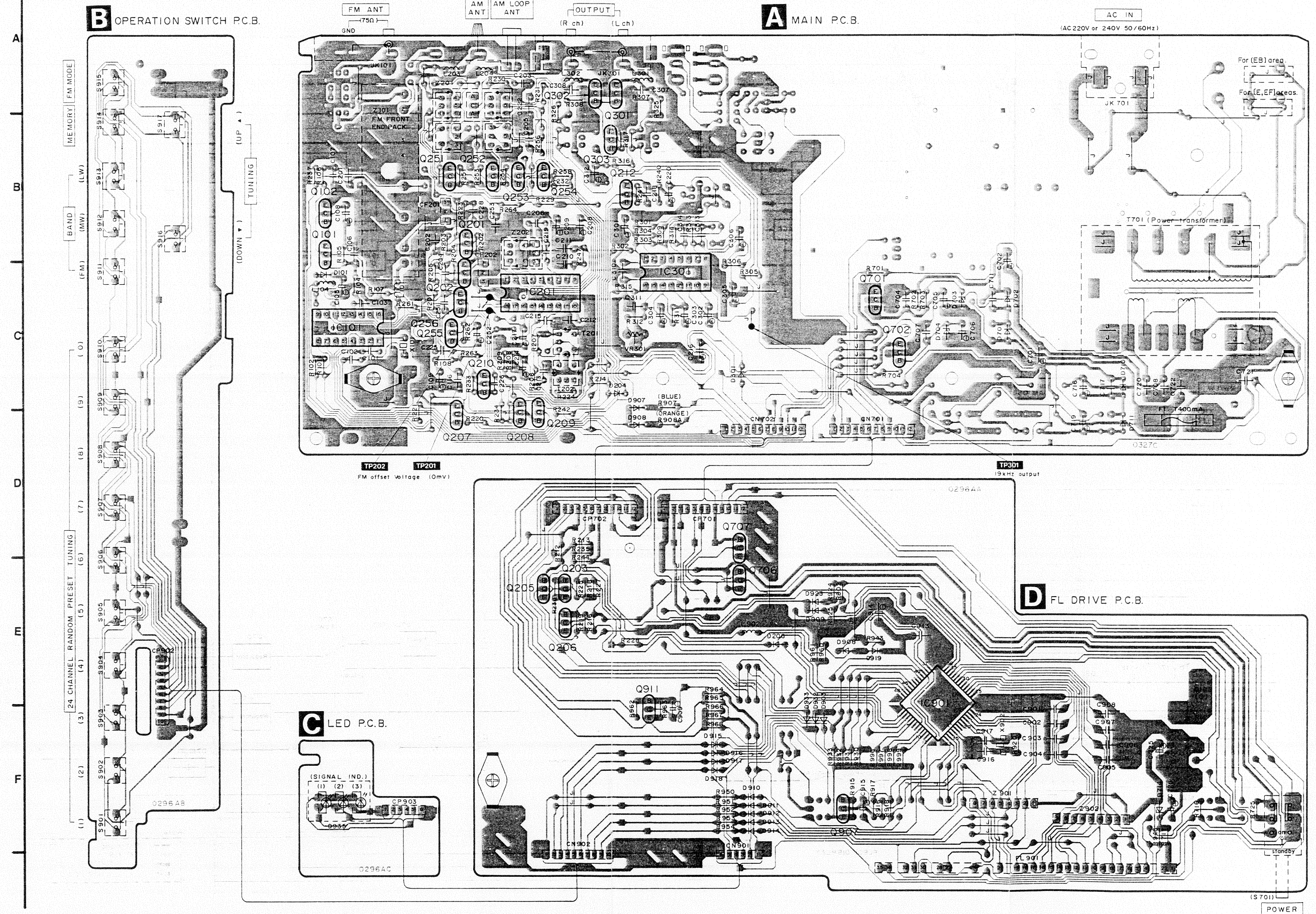
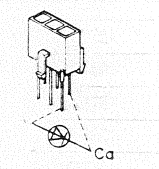
CENTER FREQUENCY
10.72 MHz
10.70 MHz
10.67 MHz

turing repair.
um coil.

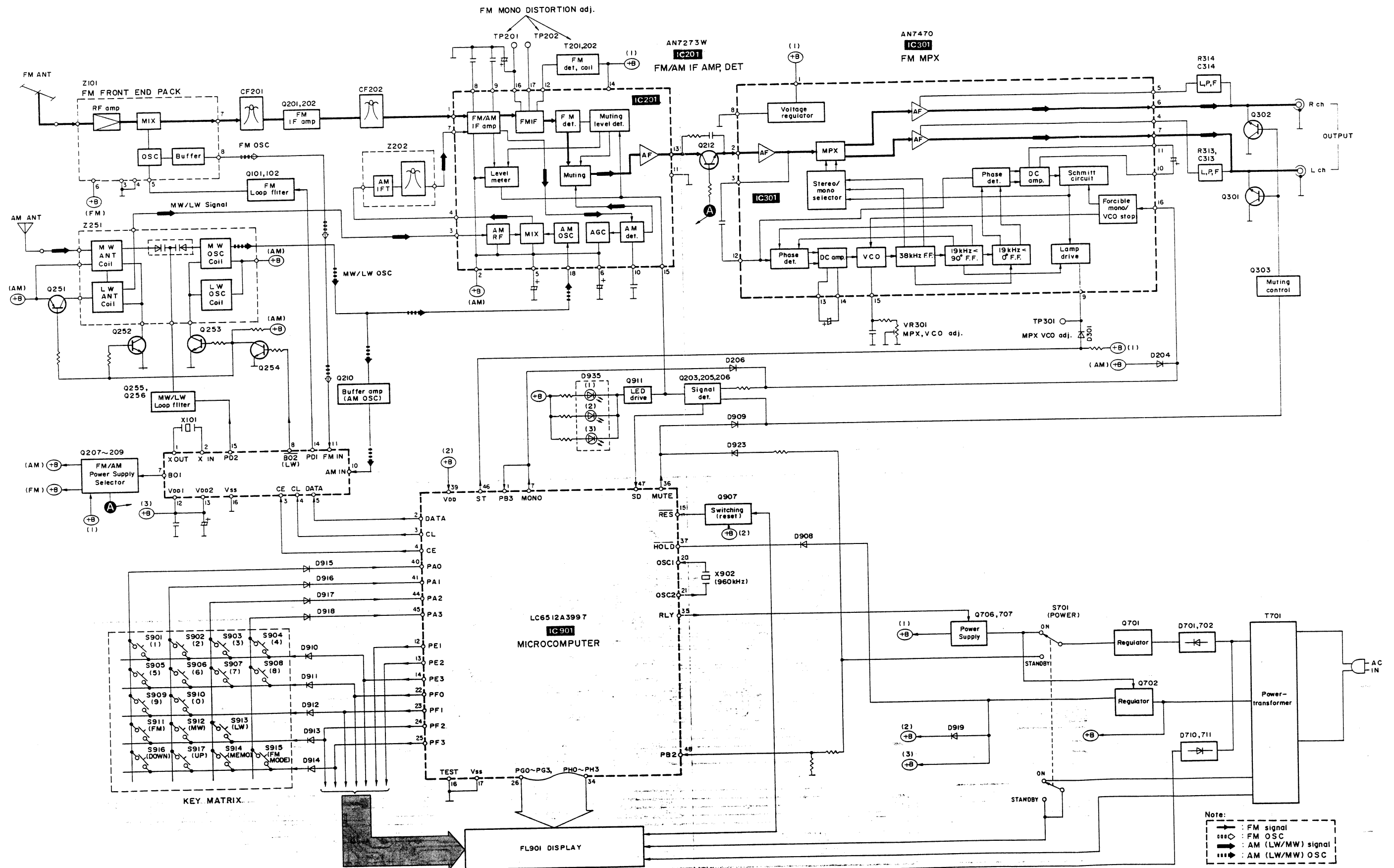
rectly.

- 333SQRSTA
- 1740SQSTA
- 114YSTP
- 114YSTP
- 144ESTP
- 124ESTP
- 144ESTP

031441P



BLOCK DIAGRAM



REPLACEMENT PARTS LIST

Notes: *Important safety notice:

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)

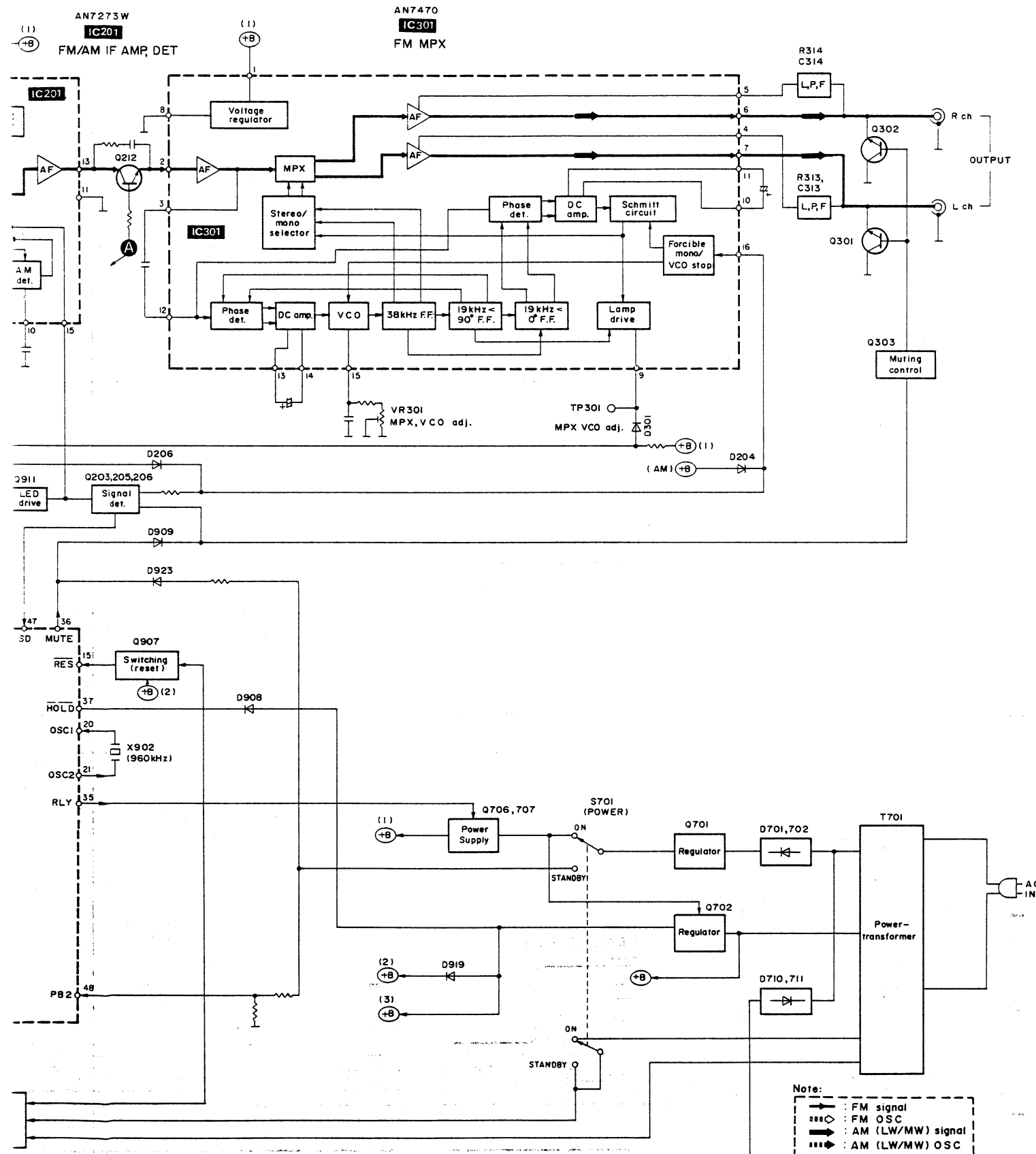
Parts without these indications can be used for all areas.

**"K" mark parts are used for black type only.

**"S" mark parts are used for silver type only.

Parts other than "K" and "S" marked are used for all color types.

*[E]: Indicates parts that are supplied by PFS. (Panasonic France S.A. Longwy division).



Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		DISPLAY TUBE		S915	EVQ21405R	SW, FM MODE	
				S916	EVQ21405R	SW, TUNING DOWN	
				S917	EVQ21405R	SW, TUNING UP	
FL901	SAD8MT102YK	DISPLAY TUBE				JACK(S)	
		SWITCH(ES)					
S701	RSP3B001-J	SW, POWER	△	JK101	RJH4202	ANTENNA TERMINAL	
S901	EVQ21405R	SW, CH1		JK301	RJH3201N	OUTPUT TERMINAL	
S902	EVQ21405R	SW, CH2		JK701	SJS9236	AC OUTLET	△
S903	EVQ21405R	SW, CH3		JK704	EYF52BC	FUSE HOLDER	△
S904	EVQ21405R	SW, CH4		JK705	EYF52BC	FUSE HOLDER	△
S905	EVQ21405R	SW, CH5		CN701, 702	RJU005W012	SOCKET (12P)	
S906	EVQ21405R	SW, CH6		CN901	RJU003K006M1	SOCKET (6P)	
S907	EVQ21405R	SW, CH7		CN902	RJU003K010M1	SOCKET (10P)	
S908	EVQ21405R	SW, CH8		CP701, 702	RJT005W012	CONNECTOR (12P)	
S909	EVQ21405R	SW, CH9		CP902	RJT003K010M1	CONNECTOR (10P)	
S910	EVQ21405R	SW, CHD		CP903	RJT003K006M1	CONNECTOR (6P)	
S911	EVQ21405R	SW, BAND FM				FUSE(S)	
S912	EVQ21405R	SW, BAND MW					
S913	EVQ21405R	SW, BAND LW		F1	XBA2C04TB0	FUSE 250V 0.4A	△
S914	EVQ21405R	SW, MEMORY					

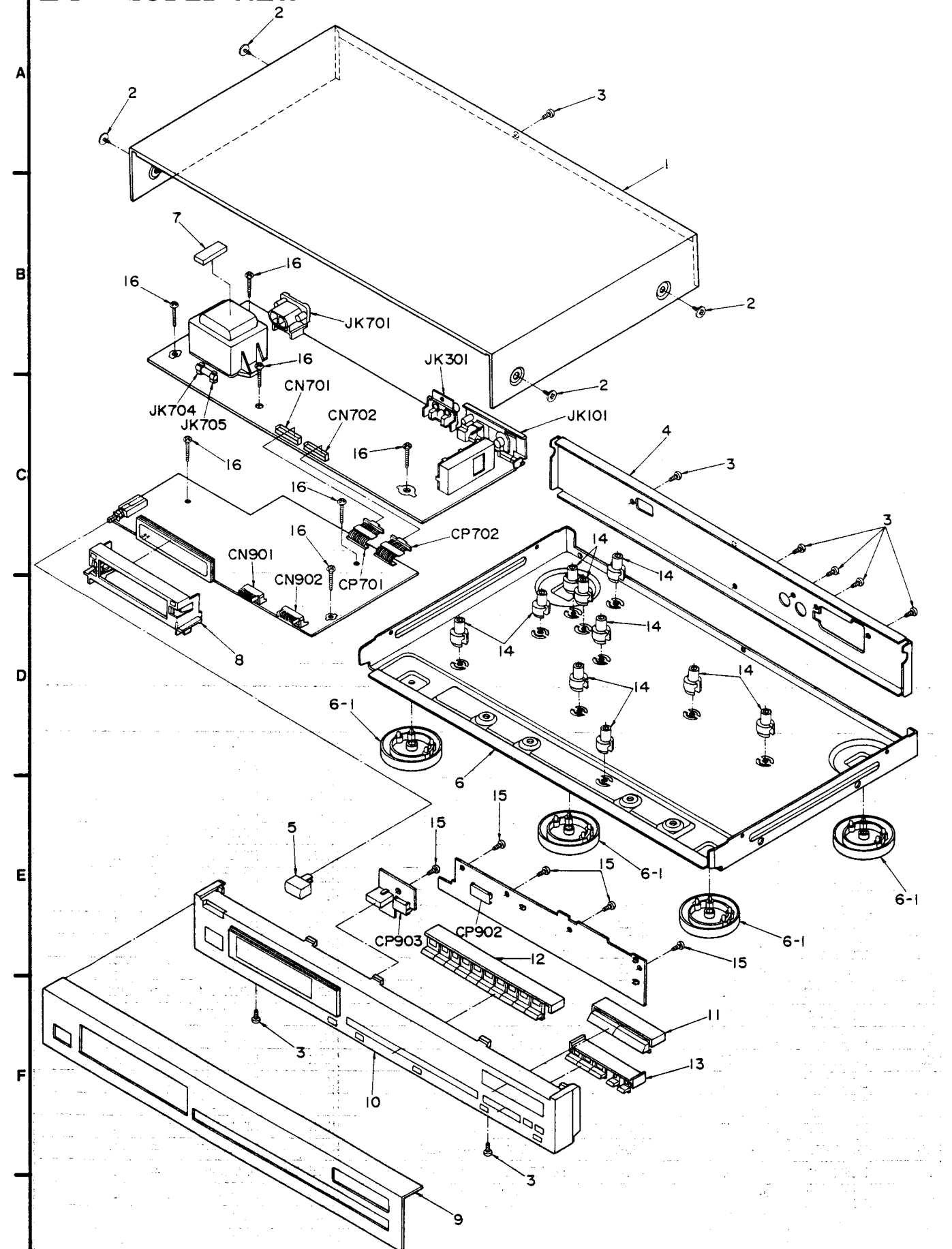
Notes : * Capacity value are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
 * Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM) , 1M=1,000k (OHM)

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R219	ERDS2TJ223T	1/4W 22K	R254	ERDS2TJ223T	1/4W 22K
			R220	ERDS2TJ103T	1/4W 10K	R256	ERDS2TJ102T	1/4W 1K
			R221	ERDS2TJ104T	1/4W 100K	R258	ERDS2TJ122T	1/4W 1.2K
R101, 102	ERDS2TJ103T	1/4W 10K	R223	ERDS2TJ471T	1/4W 470	R261	ERDS2TJ102T	1/4W 1K
R104	ERDS2TJ102T	1/4W 1K	R224	ERDS2TJ222T	1/4W 2.2K	R262	ERDS2TJ332T	1/4W 3.3K
R105	ERDS2TJ561T	1/4W 560	R225	ERDS2TJ104T	1/4W 100K	R263	ERDS2TJ153T	1/4W 15K
R106	ERDS2TJ562T	1/4W 5.6K	R227	ERDS2TJ104T	1/4W 100K	R264	ERDS2TJ102T	1/4W 1K
R107	ERDS2TJ103T	1/4W 10K	R228	ERDS2TJ123T	1/4W 12K	R301	ERDS2TJ393T	1/4W 39K
R108	ERDS2TJ151T	1/4W 150	R229	ERDS2TJ822T	1/4W 8.2K	R302	ERDS2TJ151T	1/4W 150
R201	ERDS2TJ152T	1/4W 1.5K	R230	ERDS2TJ104T	1/4W 100K	R303, 304	ERDS2TJ223T	1/4W 22K
R202	ERDS2TJ824T	1/4W 820K	R231	ERDS2TJ102T	1/4W 1K	R305, 306	ERDS2TJ332T	1/4W 3.3K
R203	ERDS2TJ331T	1/4W 330	R232	ERDS2TJ122T	1/4W 1.2K	R307, 308	ERDS2TJ104T	1/4W 100K
R204	ERDS2TJ474T	1/4W 470K	R233	ERDS2TJ564T	1/4W 560K	R309	ERDS2TJ274T	1/4W 270K
R205	ERDS2TJ331T	1/4W 330	R234	ERDS2TJ103T	1/4W 10K	R311	ERDS2TJ102T	1/4W 1K
R206	ERDS2TJ561T	1/4W 560	R235	ERDS2TJ471T	1/4W 470	R312	ERDS2TJ153T	1/4W 15K
R207	ERDS2TJ822T	1/4W 8.2K	R236	ERDS2TJ333T	1/4W 33K	R313, 314	ERDS2TJ473T	1/4W 47K
R208	ERDS2TJ102T	1/4W 1K	R237	ERDS2TJ151T	1/4W 150	R315	ERDS2TJ103T	1/4W 10K
R209	ERDS2TJ471T	1/4W 470	R240, 241	ERDS2TJ100T	1/4W 10	R316	ERDS2TJ102T	1/4W 1K
R212	ERDS2TJ153T	1/4W 15K	R242	ERDS2TJ224T	1/4W 220K	R317	ERDS2TJ473T	1/4W 47K
R213	ERDS2TJ104T	1/4W 100K	R244	ERDS2TJ822T	1/4W 8.2K	R325, 326	ERDS2TJ100T	1/4W 10
R214	ERDS2TJ824T	1/4W 820K	R247	ERDS2TJ103T	1/4W 10K	R701	ERDS1FVJ270T	1/4W 27
R216	ERDS2TJ563T	1/4W 56K	R251	ERDS2TJ103T	1/4W 10K	R702	ERDS2TJ102T	1/4W 1K
R218	ERDS2TJ563T	1/4W 56K	R253	ERDS2TJ182T	1/4W 1.8K	R703	ERDS2TJ221T	1/4W 220

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks			
R704	ERDS2TJ222T	1/4W 2.2K	C220	ECEA1CK100B	16V 10U			
R716, 717	ERDS2TJ101T	1/4W 100	C222	ECFR1E473KR	25V 0.047U			
R725	ERDS2TJ103T	1/4W 10K	C225	ECBT1C103NS5	16V 0.01U			
R902	ERDS2TJ104T	1/4W 100K	C226	ECBT1H180JC5	50V 18P			
R907, 908	ERD25V0R00T	1/4W 0	C228	ECBT1C103NS5	16V 0.01U			
R915	ERDS2TJ821T	1/4W 820	C251	ECKR1H223ZF5	50V 0.022U			
R916	ERDS2TJ272T	1/4W 2.7K	C252	ECEA1HK010B	50V 1U			
R917	ERDS2TJ103T	1/4W 10K	C253	ECKR1H223ZF5	50V 0.022U			
R918	ERDS2TJ224T	1/4W 220K	C301	ECEA1CU470B	16V 47U			
R920	ERDS2TJ105T	1/4W 1M	C302	ECEA1HKR47B	50V 0.47U			
R924	ERDS2TJ392T	1/4W 3.9K	C303	ECEA1HK010B	50V 1U			
R925	ERDS2TJ473T	1/4W 47K	C304-306	ECEA1VK3R3B	35V 3.3U			
R930-933	ERDS2TJ104T	1/4W 100K	C307, 308	ECFR1E153KR	25V 0.015U			
R943	ERDS2TJ103T	1/4W 10K	C310	ECFR1E473KR	25V 0.047U			
R946	ERDS2TJ101T	1/4W 100	C311	ECQP1471JZ3	50V 470P			
R950-954	ERDS2TJ683T	1/4W 68K	C312	ECEA1CK100B	16V 10U			
R960	ERDS2TJ103T	1/4W 10K	C313, 314	ECBT1H181KB5	50V 180P			
R961	ERDS2TJ273T	1/4W 27K	C701	ECEA1CU222YB	16V 2200U			
R962	ERDS2TJ182T	1/4W 1.8K	C702	ECEA1EU102B	25V 1000U			
R963	ERDS2TJ563T	1/4W 56K	C704	ECKR1H102ZF5	50V 1000P			
R964	ERDS2TJ561T	1/4W 560	C705	ECEA1CU221B	16V 220U			
R965	ERDS2TJ122T	1/4W 1.2K	C706	ECEA1EK4R7B	25V 4.7U			
R966	ERDS2TJ221T	1/4W 220	C707	ECKR1H102ZF5	50V 1000P			
R967	ERDS2TJ181T	1/4W 180	C708	ECKR1H103ZF5	50V 0.01U			
R968	ERDS2TJ331T	1/4W 330	C711	ECKR1H103ZF5	50V 0.01U			
R996-999	ERDS2TJ104T	1/4W 100K	C716	ECEA1WU101B	35V 100U			
		CAPACITORS	C717	ECKR1H103ZF5	50V 0.01U			
			C719	ECEA1WU101B	35V 100U			
			C720-722	ECKR1H103ZF5	50V 0.01U			
C101, 102	ECBT1H150JC5	50V 15P	C725	ECEA1VK100B	35V 10U			
C103	ECBT1C103NS5	16V 0.01U	C726	ECEA1VK3R3B	35V 3.3U			
C105	ECEA0JU101B	6.3V 100U	C901-908	ECKR1H331KB5	50V 330P			
C106, 107	ECKR1H103ZF5	50V 0.01U	C909	ECEA1EK3R3B	25V 3.3U			
C108	ECEA1EK4R7B	25V 4.7U	C913	ECKR1H103ZF5	50V 0.01U			
C109	ECEA1CU330B	16V 33U	C914	ECEA0JU102B	6.3V 1000U			
C116	ECKR1H103ZF5	50V 0.01U	C915	ECEA1HKR22B	50V 0.22U			
C201, 202	ECKR1H103ZF5	50V 0.01U	C916	ECBT1H101KB5	50V 100P			
C203	ECBT1H8R2KC5	50V 8.2P	C917	ECBT1H121KB5	50V 120P			
C204	ECBT1C103NS5	16V 0.01U						
C205	ECKR1H223ZF5	50V 0.022U						
C206	ECBT1H150JC5	50V 15P						
C208	ECEA0JU101B	6.3V 100U						
C209	ECEA1EK4R7B	25V 4.7U						
C210, 211	ECFR1E223KR	25V 0.022U						
C212	ECBT1E223ZF5	25V 0.022U						
C213	ECBT1H101KB5	50V 100P						
C214	ECEA1CK100B	16V 10U						
C215	ECBT1C103NS5	16V 0.01U						
C216	ECEA1CK100B	16V 10U						
C217	ECEA1HK010B	50V 1U						
C218	ECFR1E183KR	25V 0.018U						
C219	ECBT1C103NS5	16V 0.01U						

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
CABINET PARTS				PACKING MATERIAL			
1	RKM0032-K	CABINET	K	P1	RPG0493	CARTON BOX	K (E, EB)
1	RKM0032-S	CABINET	S	P1	RPG0494	CARTON BOX	S (E, EB)
2	SNE2129-1	SCREW	K	P1	RPG0498	CARTON BOX	(EF) F
2	SNE2129	SCREW	S	P2	RPN0325	PAD	(E, EB)
3	XTBS3+8JFZ1	SCREW		P2	RPN0124-1	PAD	(EF) F
4	RGRO081D-C	REAR PANEL	(E)	P3	SPSD152	ACCESSORIES BOX	
4	RGRO081D-A	REAR PANEL	(EB)	P4	XZB52X60A01Z	PROTECTION COVER	
4	RFKHT610LEF	REAR PANEL	(EF) F	ACCESSORIES			
5	RGU0030	POWER BUTTON	K	A1	RQA0013	WARRANTY CARD	
5	RGU0030-S	POWER BUTTON	S	A2	RQCB0169	SERVICENTOR LIST	
6	RFKJT610LE-K	CHASSIS ASS'Y		A3	RFKST610LE-K	INSTRUCTIONS MANUAL	(E)
6-1	RKA0009-1	FOOT		A3	RQT0518-B	INSTRUCTIONS MANUAL	(EB) F
7	RMG0145	RUBBER		A3	RQT0712-F	INSTRUCTIONS MANUAL	(EF)
8	RMR0277	FL HOLDER		A4	SFDAC05E03	POWER CORD	Δ (E, EF)
9	RFKGT610LE-K	FRONT PANEL ASS'Y	K	A4	SJA193	POWER CORD	Δ (EB)
9	RFKGT610LE-S	FRONT PANEL ASS'Y	S	A5	SJP2276	STEREO PIN CORD	
10	RFKNT610LE-K	FRONT GRILL ASS'Y	K	A6	SPB1163T	AM LOOP ANTENNA ASS'Y	
10	RFKNT610LE-S	FRONT GRILL ASS'Y	S	A6-1	SMA233-1M	HOLDER	
11	RGU0357-K	TUNING BUTTON	K	A6-2	XTN3+10AFZ	SCREW	
11	RGU0357-S	TUNING BUTTON	S	A7	SSA270M	FM ANTENNA	
12	RGU0358-K	CHANNEL BUTTON	K	A8	SJP9009	ATTACHMENT PLUG	(EB, EF)
12	RGU0358-S	CHANNEL BUTTON	S				
13	RGU0360-K	MODE BUTTON	K				
13	RGU0360-S	MODE BUTTON	S				
14	SHE187-2	HOLDER					
15	XTBS26+8J	SCREW					
16	XTB3+20JFZ	SCREW					

EXPLODED VIEW



DEUTSCH

Tuner

ST-610L

■ MESSUNGEN UND JUSTIERUNGEN

UKW JUSTIERUNGEN

Einstellungen der Bedienelemente und zu verwendende Geräte.

- UKW-Messender(UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analysator
- Elektronische Gleichstrom-Voltmeter(EVM)
- Frequenzzähler
- Drosselspule(100µH)
- Widerstand(100kΩ)

Anmerkung: Für Z201 und Z202 werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

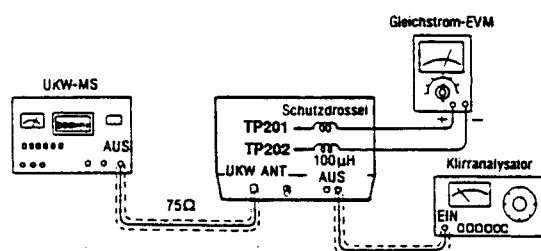
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Stellen Sie die Einheit auf "FM(UKW)" Betrieb.
3. Die Radiofrequenzanzeige und den Messender auf 100.10MHz einstellen.
4. Den Kern von T201 so justieren, daß die im Signalzustand gemessene Spannung 0mV ($0 \pm 20\text{mV}$) im 300mV-Bereich beträgt.
5. T202 so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Versichern Sie sich, daß die Verzerrungsfaktoren von Kanal L und Kanal R annähernd gleich sind und auf ein Minimum gehalten sind.

Anmerkung:

Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS

Modulation 100%
Modulationsfrequenz 1kHz
Ausgangspegel 66dB



MPX-SGO-JUSTIERUNG

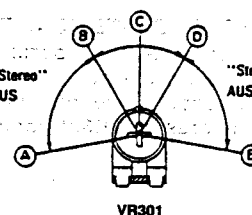
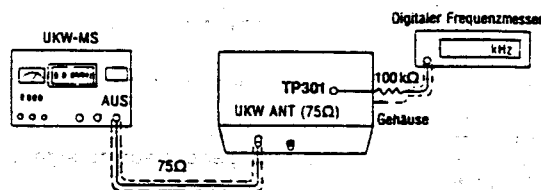
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Betriebsart-Wahlhalter in die "auto" Position stellen.
3. Radio und Meßsender auf 100.10MHz einstellen.
4. VR301 auf 19kHz $\pm 30\text{Hz}$ auf der Frequenzzähleranzeige justieren.

● VERWENDUNG EINES ALTERNATIVSYSTEMS

1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. VR301 justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von VR301 mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS

Modulation 0%
Modulationsfrequenz 0kHz
Ausgangspegel.....66dB



- ①-②..... "Stereo" AUS Stellung
- ③-④..... "Stereo" EIN Stellung (Anzeigebeleuchtung)
- ⑤..... Einstellpunkt des pilotschaltkreis'

FRANÇAIS

■ MEASURES ET REGLAGES

M.F. REGLAGES

Positionnements des commandes et équipement utilisé

- Générateur de signaux M.F.(FG-SG)
- Modulateur stéréophonique
- Analyseur de distorsion
- Voltmètre électronique à C.C. (EVM).
- Compteur de fréquence
- Bobine d'amortissement d'arrêt (100μH)
- Résistance (100KΩ)

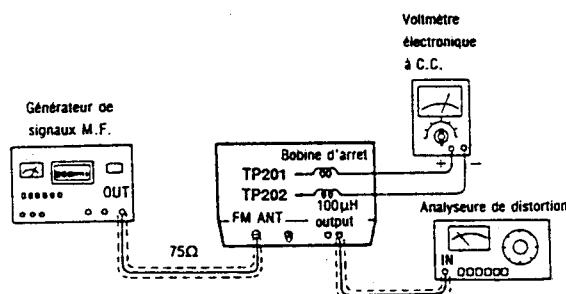
Nota: Pour Z201 et Z202, ajuster les éléments qui sont fournis. Aussi, ne pas tourner les noyaux de ces éléments.

REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur le mode "FM".
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur 100.10MHz.
4. Régler le noyau de T201 de telle sorte que la tension mesurée sur le mode de signaux soit de 0mV (0mV ± 20mV) dans une plage de 300mV.
5. Ajuster T202 de telle que le facteur de distorsion du canal de gauche soit minimisé.
6. Répéter les étapes 4 et 5 quelques fois.
7. S'assurer que les facteurs de distorsion du canal de gauche et du canal de droite soient sensiblement les mêmes et au minimum.

Nota: Le tournevis de réglage utilisé devra être fait en résines.

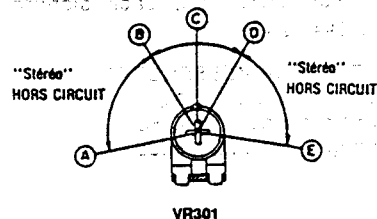
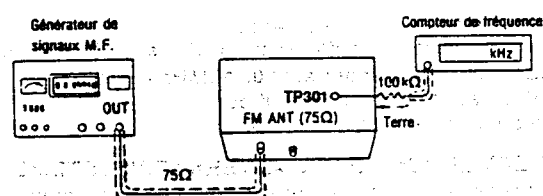
CONDITION DU GENERATEUR DE SIGNAUX M.F.
 Modulation 100%
 Fréquence de modulation 1kHz
 Niveau de sortie 66dB

REGLAGE MULTIPLEX DE L'OSCILLATEUR
COMMANDE PAR VARIATION DE TENSION

1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Régler l'appareil sur la position "auto".
3. Régler le cadran radio et le générateur de signaux sur 100.10MHz.
4. Ajuster VR301 pour 19kHz ± 30Hz sur le compteur de lecture de fréquences.

● EN UTILISANT UN SYSTEME ALTERNATIF

1. Applique un signal stéréo à partir du générateur ou recevoir une émission stéréo.
2. Ajuster VR301 jusqu'à ce que l'indicateur stéréo s'éclaire. Coller le bras de VR301 comme il est montré sur la figure.



CONDITION DU GENERATEUR DE SIGNAUX M.F.

Modulation 0%
 Fréquence de modulation 0kHz
 Niveau de sortie 66dB

- A—B, D—E..... Position de HORS CIRCUIT "Stereo".
- B—D..... Position de MISE EN CIRCUIT "Stereo". (Eclairage de l'Indicateur)
- C..... Point de réglage du circuit pilote.

ESPAÑOL

MEDICIONES Y AJUSTES

FM AJUSTES

Posiciones de control y equipo usado

- Generador de señales de FM(FM-SG)
- Modulador estéreo
- Analizador de distorsiones
- Voltímetro electrónico de CC(EVM)
- Frecuencímetro
- Bobina de choque(100μH)
- Resistor(100kΩ)

Nota: Para Z201 y Z202, se suministran piezas ajustadas. Por lo tanto, no cambie los núcleos de estas piezas.

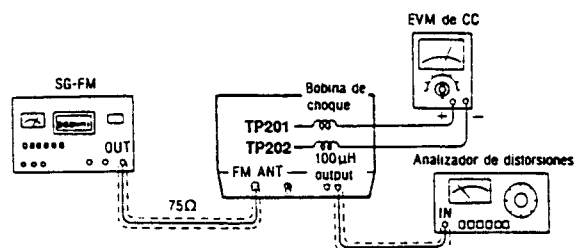
AJUSTE DE DISTORSION MONO FM

- 1.La conexión del equipo de pruebas se muestra en la figura.
- 2.Poner la unidad en modalidad de "FM".
- 3.Poner la puesta de la presentación de radiofrecuencia y generador de señales a 100,10MHz.
- 4.Ajustar el núcleo de T201 de manera que el voltaje medido en modalidad de señal sea 0mV ($0 \pm 20\text{mV}$).
- 5.Ajustar T202 de manera que el factor de distorsión de CH-I se minimice.
- 6.Repetir los pasos 4 y 5 algunas veces.
- 7.Asegurarse de que los factores de distorsión de CH-I y CH-D sean casi los mismos y los mínimos.

Nota:

El destornillador de ajuste usado debe estar hecho de resina.

CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 100%
Frecuencia de modulación 1kHz
Nivel de salida 66dB



AJUSTE DE MPX VCO(OSCILADOR CONTROLADO POR VOLTAJE MPX)

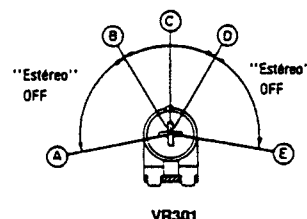
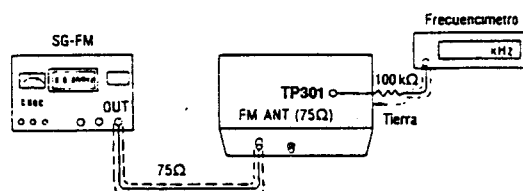
- 1.La conexión del equipo de pruebas se muestra en la figura.
- 2.Poner la unidad en la posición de "auto".
- 3.Poner la presentación de la radio y la puesta del generador de señales en 100.10MHz.
- 4.Ajustar VR301 para 19kHz $\pm$ 30Hz en lectura de frecuencímetro.

* USANDO SISTEMA ALTERNATIVO

- 1.Aplicar señal estereofónica del generador o recibir la emisión estereofónica.
- 2.Ajustar VR301 hasta que la presentación de estéreo se encienda. Fijar el brazo de VR301 como se muestra en la figura.

CONDICION DE GENERADOR DE SEÑALES DE FM

Modulación 0%
Frecuencia de modulación 0kHz
Nivel de salida 66dB



- A-B, D-E..... Pósição de "estéreo" OFF.
- B-D..... Pósição de "estéreo" ON. (Indicador encendido)
- C..... Punto de ajuste de circuito piloto.